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Sir:

Transmitted herewith for filing is the 17-page patent application specification of

Inventor: Hiroshi Abe and Noboru Ichihara

For: SMALL APPARATUS FOR DISPENSING CIRCULAR PLATE OBJECTS

along with:

(x) Return prepaid postcard.

(x) 9 sheet(s) of informal drawings.

(x) A Declaration and Power of Attorney UNSIGNED

(x) A Verified Statement Claiming Small Entity Status - Small Business Concern UNSIGNED

CLAIMS AS FILED

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Total Claims	11 - 20 =	0 x	11	\$0
Independent Claims	2 - 3 =	0 x	41	\$0
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Sept 11, 1998
Date

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CERTIFICATION UNDER 37 CFR 1.10

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Applicant or Patentee: HIROSHI ABE and NOBORU ICHIHARA
 Application or Patent No.: / Unknown
 Filed or Issued: Herewith
 For: SMALL APPARATUS FOR DISPENSING CIRCULAR PLATE OBJECTS

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(c))—SMALL BUSINESS CONCERN

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

Name of Concern ASAHI SEIKO CO., LTD.
 Address of Concern 24-15, Minami Aoyama 2-chome
Minato-ku, Tokyo, Japan

I hereby declare that the above identified small business concern qualifies as a small business concern, as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third-party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to, and remain with, the small business concern identified above, with regard to the invention entitled SMALL APPARATUS FOR DISPENSING CIRCULAR PLATE OBJECTS,

by inventor(s) HIROSHI ABE and NOBORU ICHIHARA,
 described in

- ☒ the specification filed herewith.
☐ application no. / _____, filed _____.
☐ patent no. _____, issued _____.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c), if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

2025-05-20

Name _____

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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small business entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Name of Person Signing _____ HIROSHI ABE

Title of Person Other Than Owner _____ President and C.E.O.

Address of Person Signing _____ 24 15, Minami Aoyama 2 chome

Minato ku, Tokyo, Japan

SIGNATURE

UNSIGNED
HIROSHI ABE

Date _____

SMALL APPARATUS FOR DISPENSING CIRCULAR PLATE OBJECTS

Field of the Invention

5 This invention relates to a discharge apparatus for disc bodies for discharging a disc type coin such as money and a disc type medal used in a game machine. Especially, this invention relates to a discharge apparatus for disc bodies which can simply regulate the thickness depending on the thickness of the desired disc body for which a discharge is desired. Furthermore, this invention relates to a discharge apparatus for changeable disc bodies which can simply regulate the size depending on the size of the disc body. In other words, this invention relates to a discharge apparatus simply applicable to the size of each country coin depending on the coin of each country.

10 Especially, this invention relates to the discharge apparatus for the disc bodies which can simply change the size of a discharge hole corresponding to the size of the desired disc body which desires a discharge. In other words, this invention relates to the discharge apparatus for the disc bodies which can simply change the size of a discharge hole corresponding to the size of the various coins of each country.

Background of the Invention

20 As to the discharge apparatus for the conventional disc bodies, the shaft which rotates the disc (for example, the reference number 22 of Fig. 1) for discharging each coin was a revolving shaft of a gear apparatus. And, the revolving shaft (for example, the reference number 19 of Fig. 1) of a gear apparatus had geared with the rotating shaft of an electric motor. In other words,

as to the discharge apparatus for the conventional disc bodies, the disc for a coin discharge was arranged beside (off set from) the rotating shaft of an electric motor. In other words, as to the discharge apparatus for the conventional disc bodies, the disc for a coin discharge was arranged beside the rotating shaft of an electric motor and was fixed to the revolving shaft of the coupled gear apparatus.

Moreover, the washer (not shown) depending on the thickness of the coin was installed to the revolving shaft of the disc for a coin discharge. In other words, the height of the thickness for a substrate (for example, the reference number 11 of Fig. 1), i.e., the height of the coin disc, was adjusted with the washer.

Therefore, the rotating shaft of an electric motor and the revolving shaft of the gear apparatus arranged horizontally are arranged in parallel. However, since these revolving shafts are in a separated position mutually, the whole apparatus becomes large horizontally. In addition, since the revolving shafts of a gear apparatus was locked by screw to the disc for a discharge when a user exchanged the disc for a coin discharge, removal was complicated.

Moreover, when the washer for adjusting the thickness of the coin was mounted, the user needed to remove the disc for a discharge, or the user needed to remove the revolving shafts.

A discharge apparatus for the conventional disc bodies is shown in Fig. 7. A discharge apparatus is equipped with the disc for discharging the coin each one. A rotating shaft is inserted in the center section of a disc as to the discharge apparatus of Fig. 7. And, the coin is discharged when the disc is rotated. In other

words, the disc for discharging a coin is fixed to the revolving shaft of the gear apparatus coupled with the electric motor as to the conventional discharge apparatus for disc bodies.

Therefore, the disc for discharging a coin needed to be exchanged depending on the size of the coin discharged. And, the disc for a discharge was fixed with the screw to the revolving shaft of a gear apparatus. Therefore, the removal was complicated.

Summary of the Invention

It is an object of this invention to provide for a discharge apparatus for disc bodies which has a small and simple structure, which can easily change the disc for a coin discharge by one-touch and to which the regulation of the coin thickness is made extremely easily.

It is a further object of this invention to provide for a discharge apparatus of the disc body which can simply change the size of a discharge hole depending on the size of the disc body which desires a discharge and for which the disc for a discharge is simply changeable depending on the required coin size.

The invention offers a discharge apparatus for disc bodies which has a small and simple structure by arranging the rotating axle line of an electric motor, and the axis of rotation of a gear apparatus on the same straight line.

The discharge apparatus of this invention can easily exchange the discs for discharging coin by one-touch. Especially, the discharge apparatus by this invention can also perform a regulation of the coin thickness extremely simply.

Brief Description of the Drawings

It follows a description of embodiments of this invention, referring to the attached drawings of which:

Fig. 1 is a generally perspective, exploded view of the present invention;

5 Fig. 2 is a generally perspective assembled view of apparatus of Fig. 1;

Fig. 3 is a section view of the apparatus of Fig. 2;

Fig. 4A is a side view of the apparatus showing a first relative position;

Fig. 4B is a view showing the apparatus in a second relative position;

10 Fig. 5 is an enlarged perspective view of another example of the shaft retaining stopper of Fig. 1;

Fig. 6 is a perspective, exploded view and showing a further embodiment of the disc of this invention;

Fig. 7 is a perspective, assembled view of the disc of Fig. 6;

Figs. 8A and B are an elevational view from Fig. 6, Fig. 7, respectively; and

15 Fig. 9 is an enlarged sectional and elevational view of a further embodiment of the disc of Fig. 6.

Description

With reference to Fig. 1, a large square plate member defines a substrate 11 for attachments. The central part of the substrate 11 is equipped with keyed
20 through-hole 12. The circle ring type small elevation body 13 is made from resin. The upper half of the elevation body 13 can elevate the inside of the through-hole 12 freely. In addition, the upper half of the elevation body 13 is equipped with a protrusion 14 of a detent. Therefore, it is desirable that the keys of the through-

hole 12 and the elevation body 13 can elevate the inside of the through-hole 12 and the elevation body 13 are cooperative square to provide for axial movement of the elevational body.

5 The lower half of the elevation body 13 is elongated to prevent the elevation body 13 from coming out of the through-hole 12. The bottom of the elevation body 13 provides a plurality of saw-teeth 15. A magnifying-glass type operation body 16 shown in the central part of Fig. 1 may be made from resin. The top part of a ring part thereof provides a saw-teeth 17. The saw-teeth 17 can mesh with the saw-teeth 15 of the elevation body 13. In addition, the haft part of the operation body 16 includes an arc type long hole 18. The operation body 16 is fixed by a screw to the undersurface of the substrate 11 via the long hole 18.

10 As to the bottom of Fig. 1, a ring type thick fairly large cover plate 31 cooperates to enclose a planetary gear apparatus 30 (refer Fig. 3). This cover plate 31 is fixed to the undersurface of the substrate 11 via plurality screws passing through collars 21.

15 A short revolving shaft 19 is inserted in the through-hole 12, the ring type elevation body 13, the ring part of the operation body 16 and the cover plate 31 as shown in top part of Fig. 1 to rotate freely thereon. A disc 22 is coupled to the upper-part end of the revolving shaft 19. The disc 22 is fixed to the revolving shaft 19 by means of a screw 23 (refer Fig. 3). In other words, the revolving shaft 19 is fixed integrally in the center of the disc 22. Therefore, the disc 22 and the revolving shaft 19 may be integrally formed by sintered metal, etc.

As to the left part of the center of Fig. 1, there is included a stopper 10. The stopper 10 is equipped with a wedge part 9 of a tooth shape. The stopper 10 prevents the revolving shaft 19 from coming off the assembly. The short revolving shaft 19 is explained below. The revolving shaft 19 is made from a metal. The revolving shaft 19 is equipped with a cone part 8. The upper end part of the revolving shaft 19 comprises a D shape nut part 7 received through a cooperatively shaped hole in the disc 22. The lower-end part of the revolving shaft 19 comprises a hexagonal gear part 6. Furthermore, the disc type thick planet-gear apparatus in Fig. 3 is explained here.

First, the projection edge part of the cylinder type rotating shaft (not shown) of the electric motor 40 is equipped with a small sun type gear (not shown). And, a plurality of planet gears (not shown) is arranged so that it may gear around a sun type gear. Furthermore, a large internal-tooth gear (not shown) which gears with a planet gear is fixed. And, each shaft of a planet gear is rotatably inserted in a hole 33 of a carrier board 32 (see Fig. 1). Therefore, if the electric motor 40 is operated, the carrier board 32 and gear arrangement will reduce speed and rotate the shaft 19.

The carrier board 32 is equipped with a splined bore 34 at a central part. The gear part 6 of the revolving shaft 19 is cooperatively splined for insertion through the cylinder bore 34.

As to the discharge apparatus of this example which consists of the above mentioned component, as shown in Fig. 2 and 3, the upper half of the elevation body 13 is first positioned and vertically movable through the through-hole 12 of

the substrate 11. And, the ring part of the operation body 16 is in contact with the bottom of the elevation body 13. The saw-teeth 15 and 17 gear and the haft part of the operation body 16 is fixed by connection of the operation body 16 to the undersurface of the substrate 11. That is, a screw (not shown) is inserted in the long hole 18 of the haft part of the operation body 16 and is fixed to the undersurface of the substrate 11.

Next, as to the undersurface of the substrate 11, the planet-gear apparatus 30 and the electric motor 40 are attached via a plurality of collars 21 and the cover plate 31. And, the nut part 7 of the revolving shaft 19 is penetrated in the central hole of the disc 22 and is fixed by a screw 23 (refer Fig. 3). After this, the gear part 6 of the revolving shaft 19 is through the ring type elevation body 13, the ring part of the operation body 16 and the ring type cover plate 31.

The gear part 6 is further inserted in the cylinder bore 34 of the carrier board 32 of the planetary gear apparatus 30 and is geared mutually. Hereafter, the wedge part 9 at the end of the stopper 10 is penetrated via the long hole 5 of the ring part in the operation body 16 and the hole of the cylinder part 35 which is formed in the central part of the cover plate 31. In this way, the wedge part 9 contacted with the cone part 8 of the revolving shaft 19 thereby the revolving shaft 19 is prevented (refer Fig. 3) from coming off and releasing the disc 22. In addition, the stopper 10 is locked by screw (not shown) on the undersurface of the substrate 11 via the long hole 4 of an element edge part.

The situation of Fig. 2 and 3 is shown in (A) of Fig. 4. That is, the operation body 16 is not operated. That is, the elevation body 13 completely meshes into

gears with the operation body 16 via saw-teeth 15 and 17. In other words, the elevation body 13 has not projected from the substrate 11 and thereby spaces the disc 22 relative to the substrate 11 in a first relative position and related to the thickness of disc bodies accepted into openings in the disc 22. Therefore, since the space 3 of the substrate 11 and the disc 22 is the lowest, the thin disc bodies (not shown) such as coins are applicable. If the haft part of the operation body 16 is rotated when the disc bodies such as coins are thicker, the elevation body 13 will be adjusted via the engagement between saw-teeth 15 and 17. Therefore, as shown in (B) of Fig. 4, the space 2 of the substrate 11 and the disc 22 is increased and can adapt the thickness of thicker disc bodies such as thicker coins. That is, the inclination surface which forms the saw-teeth 15 of the elevation body 13 raises by the inclination surface which forms the saw-teeth 17 of the operation body 16. As a result, the elevation body 13 projects from the substrate 11 and displaces the disc 22 which it engages. The bottom of the elevation body 13 provides an inclination surface. The operation body 16 with the ramp contacted to an inclination surface is produced. And, the operation body 16 is slidably arranged for the substrate 11. In this case, the adjustment of the operation body 16 and disc 22 is provided without rotation. Therefore, the elevation body 13 and disc 22 can raise.

In addition, as to this above-mentioned example, the central-axis line of the whole apparatus is aligned along one central-axis line 41 as clearly shown in Fig. 3. That is, the central-axis line of the revolving shaft 19, the central-axis line of the thick disc type planetary gear apparatus 30 and the central-axis line of the

electric motor 40 are lying in a straight line. For this reason, the structure becomes simple and firm. Moreover, the attachment of an apparatus becomes easy. Therefore, the disc bodies such as coins can be discharged from any selected direction of 360 degrees. Furthermore, if the disc 22 and the revolving shaft 19 are formed integrally, they can be coupled by one step only by the gear part 6 being inserted in the cylinder bore 34. In other words, they can couple only by the gear part 6 of the lower end of the revolving shaft 19 being inserted in the cylinder bore 34 of the carrier board 32.

Moreover, the discharge apparatus of this example can be simply adjusted to the coin thickness. For this reason, as the disc 22 corresponding to the size of various coins is ready, this apparatus is easily applicable to the coins of each country. In addition, as above mentioned, although the gear part 22 of the revolving shaft 19 and the bore 34 of the carrier board 32 have a hexagonal shape, respectively, these components may consist of star type or petal type. In other words, it is desirable that the hexagonal spine is the shape which is not deformed under a strong torque.

Fig. 5 shows the other example of a stopper 100. This stopper 100 is equivalent with two small-hole 9H at the apical surface of the wedge part 9 of a flea tooth shape. A small steel ball 9B is embedded via the grease for lubrication in the small hole 9H, respectively. In this way, as the wedge part 9 is in contact with the cone part 8 of the revolving shaft 19 via the steel ball 9B, the wedge part 9 is not worn out.

The discharge apparatus by this invention can also perform regulation of the coin thickness extremely simply and can easily exchange the discs for discharging a coin by one step.

As to the disc 22 and as shown in Fig. 6, a thick large disc is the main disc 51 which forms the principal part of the discharge apparatus for discharging the disc body in accordance with this invention. The main disc 51 is made with a sintered metal or a die cast. The main disc 51 is inserted in the upper end part of a rotating shaft 53 via a cylinder part 52 formed in the central part and is secured.

The rotating shaft 53 is rotated counterclockwise (Fig. 6) by means of a drive unit comprising an electric motor and a gear apparatus (not illustrated). The main disc 51 is equipped in a peripheral direction with four fairly large openings 54 at equal intervals. The circumference part of the under-surface of the main disc 51 is equipped in a peripheral direction with four triangular type fairly large hollows 55 at equal intervals. Therefore, four long and slender cutoff notches formed on the long-side part of the triangle of a hollow 55 are formed on the circumference of the main disc 51.

The top part of the hollow 55 formed against a cutoff notch is connected to a through-hole 53. A long and slender arm 56 is formed between adjacent hollows. In addition, the long and slender arm 56 is notched. Therefore, when the main disc 51 rotates contact between a guide pin (not shown) and the long and slender arm 56 is prevented. Some small holes 57 are formed on the circumference part of the upper surface of the main disc 51. A small hole 57 embeds a forceful magnet 58 made from a rare earth metal.

As to the upper part of Fig. 6, a thin large disc is the iron cover disc 61 which forms the principal part of the discharge apparatus for the disc bodies in accordance with this invention. The cover disc 61 is equipped with an open hole 62 at its central part. An open hole 62 relieves the cylinder part 52. The cover disc 61 is in a peripheral direction equipped with four fairly large penetration tubes 64 at equal intervals adapted to register with openings 54. The penetration tube 64 is formed downward. In addition, the diameter and the depth of the penetration tube 64 are selected in consideration of the size of the disc body for which a discharge is desired. The circumference part of the cover disc 61 includes protrusions 67. The protrusions 67 face downward. Each protrusion 67 is received in the small hole 57 to couple the main and cover discs 51,61.

In addition, a stir pin 69 is used in place of the protrusion 67 suitably. In this case, the stir pin 69 is made from iron. And when the stir pin 69 is used, the cover disc 61 can also be molded by resin.

As to this example which consists of the above component, the cover disc 61 is put on the main disc 51. And, they are integrated as shown in Fig. 7. That is, the open hole 62 of the cover disc 61 is inserted in the cylinder part 52 of the main disc 51. Moreover, the protrusion 67 is put in the small hole 57. The protrusion 67 and magnets 58 retain the cover disc 61 to the main disc.

In this way, if the disc body comes from the upper part of Fig. 7, an electric motor (not shown) will operate. And, the cover disc 61 rotates counterclockwise. In this way, the disc body is put into the penetration tube 64 of any one of the cover disc 61. When the cover disc 61 rotates, the disc body put into the

penetration tube 64 slides on the upper surface of a base (not shown). One disc body which slides on the upper surface of a base is pushed from the penetration tube 64 into the opening 55 by a guide pin (not shown) which projects from the upper surface of a base into the space between main disc 51 and base.

5 And, when the cover disc 61 is rotated further, one of the disc bodies is pushed by a regulation pin (not shown) which projects from the upper surface of a base. At this time, one of the disc bodies is moved radially outwardly to the exterior of the cover disc 61 by action of the arm 56. Furthermore, the cover disc 61 rotates, the disc body is pushed by only the arm 56 to the exterior of the cover
10 disc 61 for discharge thereof. For this reason, the arm 56 is slotted in order to pass a guide pin or a regulation pin, respectively.

Fig. 9 shows the enlarged principal part of the other example of this invention.

15 The circumference part of a main disc 91 forms a plurality of screw holes 97. And, the circumference part of a cover disc 101 forms a plurality of small holes 107. And, the cover disc 101 is put on the main disc 91. They are integrated as shown in Fig. 8. That is, the open hole 62 of the cover disc 101 is inserted in the cylinder part 52 of the main disc 91. And, screw 109 is penetrated in a small hole 107 and is fixed to the screw hole 97. In this case, the head part
20 110 of the Bis-screw 109 is used in place of the stir pin 69.

As mentioned above, according to this invention the main disc of a piece is provided. Furthermore, a plurality of cover discs corresponding to various coins is provided. Therefore, the discharge apparatus for the disc bodies which can

change size of a discharge hole simply by only choosing a cover disc depending on the size of the disc body discharged according to this invention is obtained. In other words, the discharge apparatus for the disc bodies which can change size of a discharge hole simply depending on the size of the disc body discharged according to this invention is obtained. Especially, the discharge apparatus for the disc bodies according to this invention can exchange the disc for a discharge simply depending on the size of the required coin.

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I CLAIM:

1. A discharge apparatus for disc bodies comprising;

a fixed substrate;

a disc spaced from said substrate a distance related to the thickness of said

5 disc bodies, said disc including at least one opening having a diameter adapted to receive a disc body;

means for rotating the disc to accept disc bodies in said opening and said space for discharge thereof; and

10 means for adjusting said space to accept disc bodies of differing thicknesses.

2. The apparatus of claim 1 wherein said rotating means includes a shaft coupled between said disc and means for rotating the shaft for axial movement thereof and said adjusting means included means for axially moving the shaft to position said disc.

15 3. The apparatus of claim 2 including a splined connection between said shaft and said rotating means.

4. The apparatus of claim 2 wherein said adjusting means includes an elevation body disposed about the shaft and at one end engaging the disc and at the other end including a plurality of axially extending projections and an operation
20 body including a plurality of projections adapted to engage the projections on said elevation body, engagement of said projections displacing said disc to adjust said space.

5. The apparatus of claim 4 wherein, relative to said shaft, said projections on said elevation body and said operation body are arranged annularly and are adapted to, in response to rotation of said operation body, engage to displace said disc to adjust said space.

5 6. The apparatus of claim 1 wherein the rotating means includes a shaft coupled to the disc at one end thereof and at the other end coupled to a carrier board, a motor and a planetary gear drive between said carrier board and said motor.

10 7. The apparatus of claim 1 wherein said disc includes a main disc having coupled to one face thereof a cover disc each including bores adapted to register to define said opening, said disc bodies accepted through said cover disc into said opening, said main disc including at least one arm disposed in said space and adapted to engage a disc body in said space for discharge thereof.

15 8. The apparatus of claim 7 wherein said main and cover discs are coupled by one of said discs including a ferromagnetic element and the other including a magnetic element.

9. The apparatus of claim 7 wherein said cover disc includes a protruding pin adapted to stir said disc bodies.

20 10. A discharge apparatus for disc bodies comprising;
a fixed substrate;
a disc spaced from said substrate a distance related to the thickness of said disc bodies, said disc including at least one opening having a diameter adapted to receive a disc body;

a shaft coupled between said disc and means for rotating the shaft for axial movement thereof to space said disc relative to said substrate, rotation of said disc to accept disc bodies in said opening and said space for discharge thereof;

5 an elevation body disposed about the shaft and at one end engaging the disc and at the other end including a plurality of axially extending projections; and

an operation body including a plurality of projections adapted to engage the projections on said elevation body, engagement of said projections displacing said disc to adjust said space to accept disc bodies of differing thicknesses.

10 11. The apparatus of claim 10 including a stopper to retain said shaft to said substrate.

Abstract of the Invention

An apparatus for dispensing disc bodies such as coins or tokens is set forth which includes a fixed substrate and a dispensing disc spaced from said substrate a distance related to the thickness of said disc bodies. The dispensing disc includes a plurality of openings having a diameter adapted to receive a disc body for dispensing thereof. The dispensing disc is attached to a shaft which is axially moveable to adjust the space between the dispensing disc and substrate. The shaft is connected to a motor through an axially aligned planetary gear apparatus. Rotation of the dispensing disc receives coins or tokens in the openings and space whereupon the coins are moved for dispensing. An elevation body engages the dispensing disc and includes a plurality of annular teeth. An adjustment body has teeth to engage the elevation body teeth. Rotation of the adjustment body axially adjusts the elevation body and dispensing disc to adjust the space to accept different thicknesses of coins.

Fig. 1

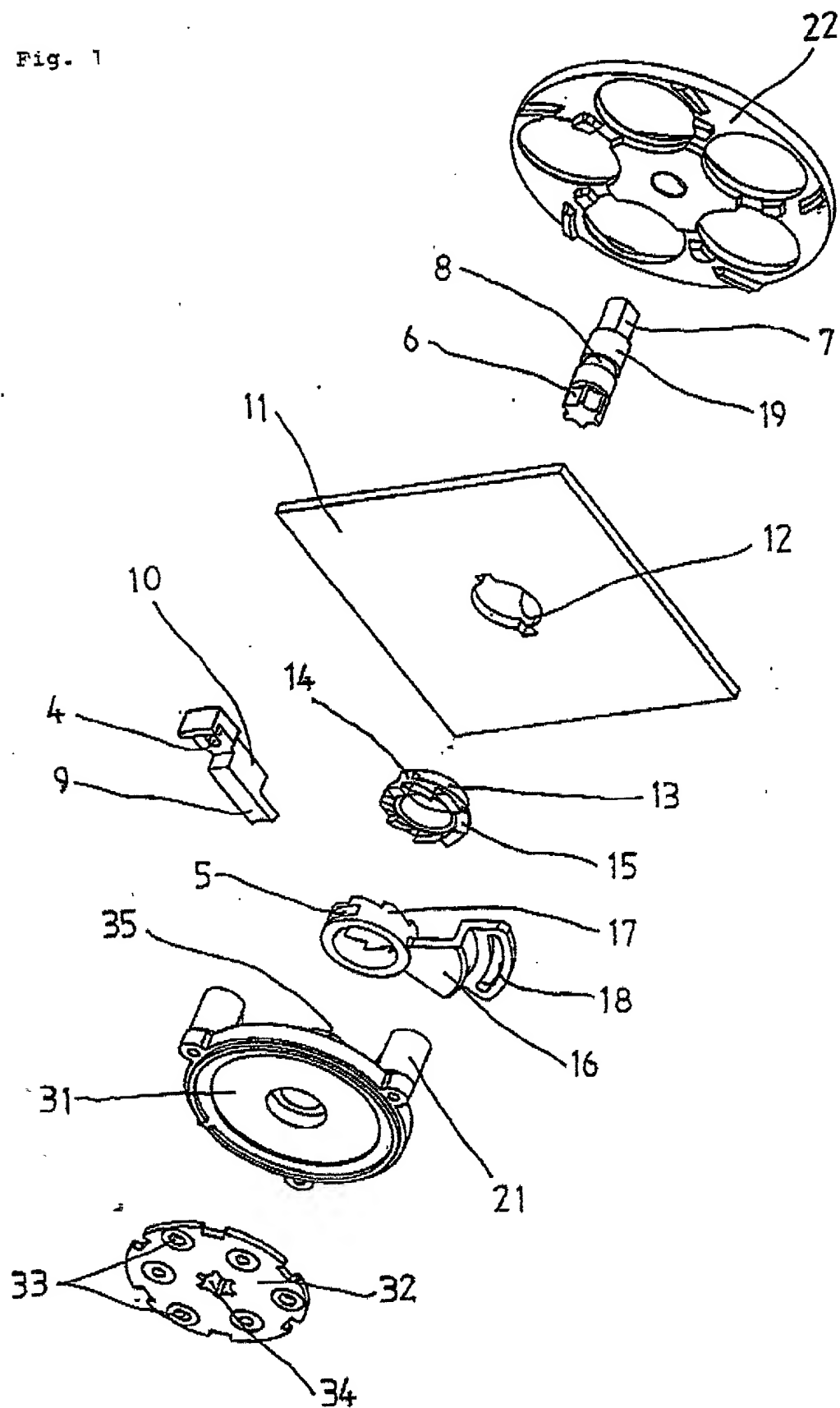


Fig. 2

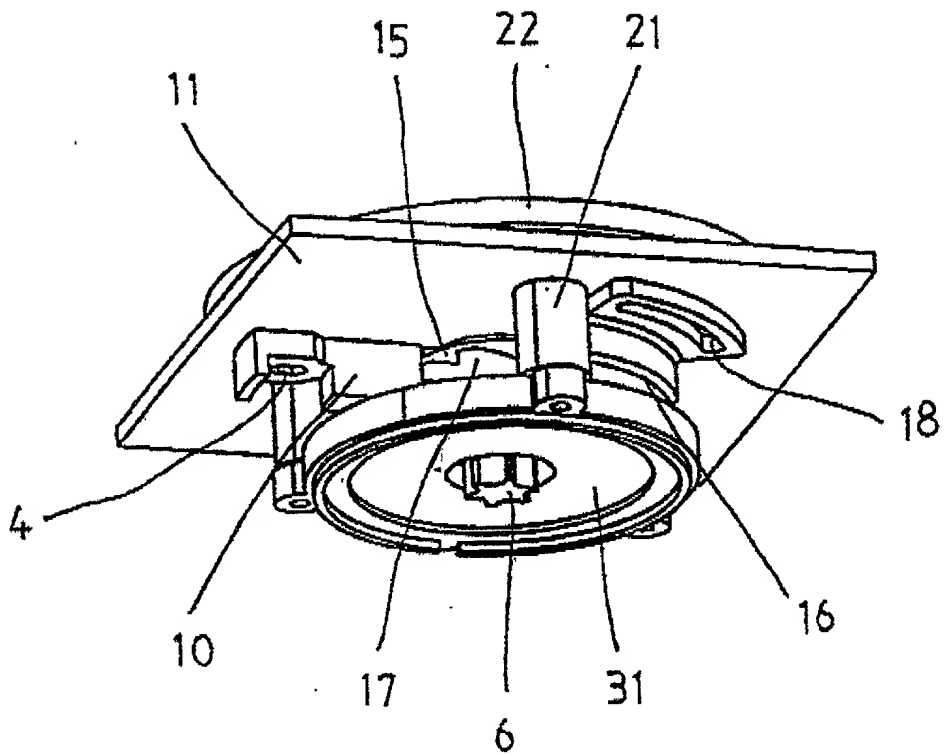


Fig. 3

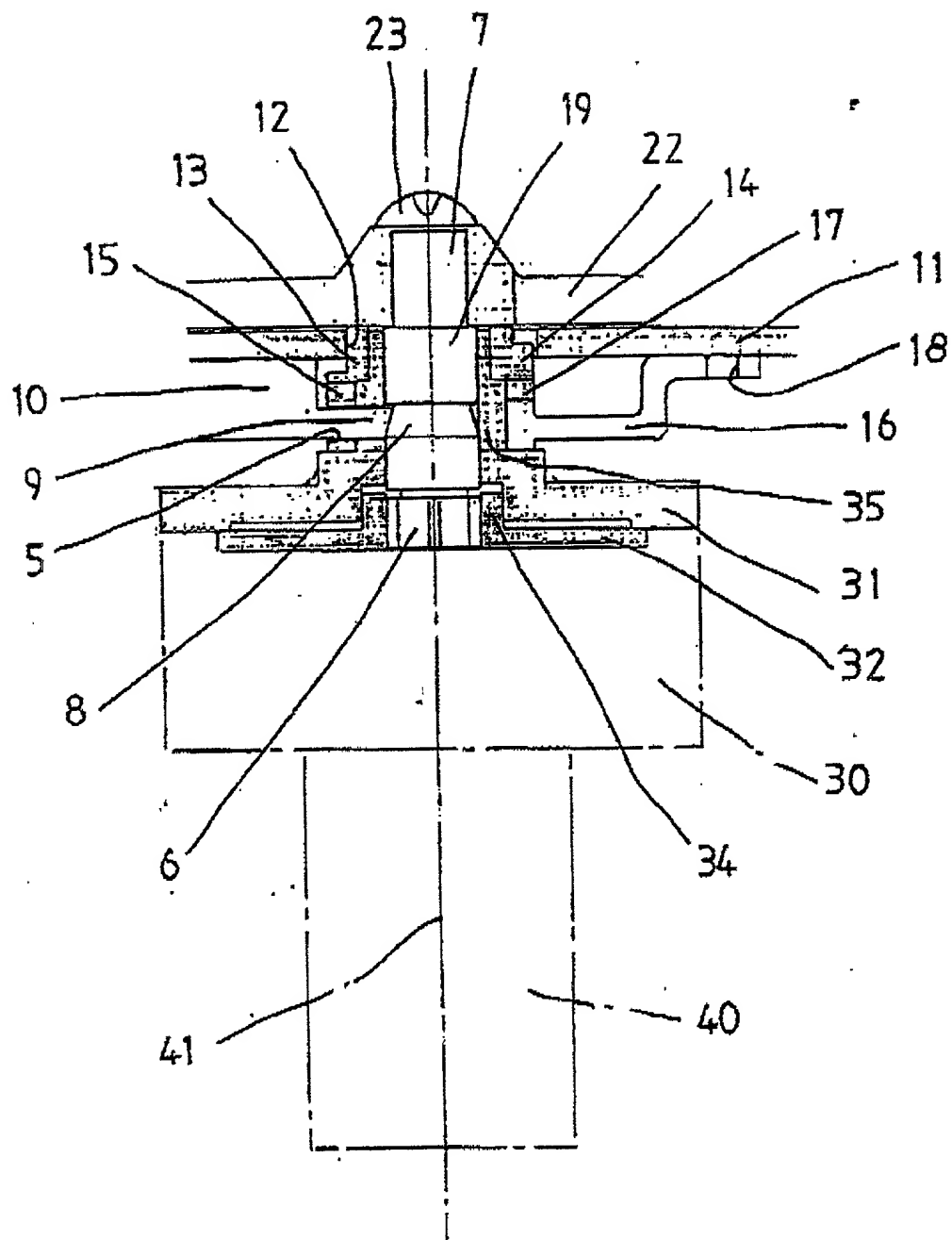
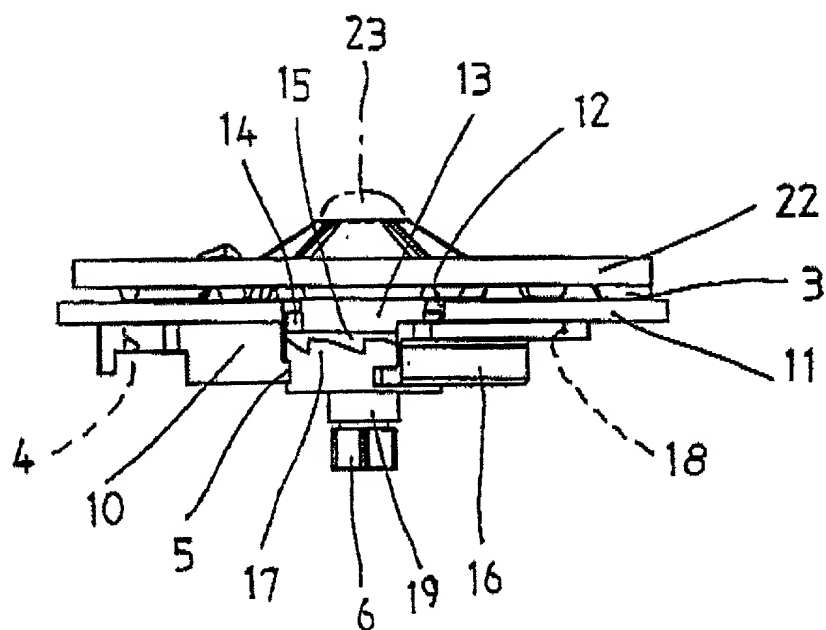


Fig. 4

(A)



(B)

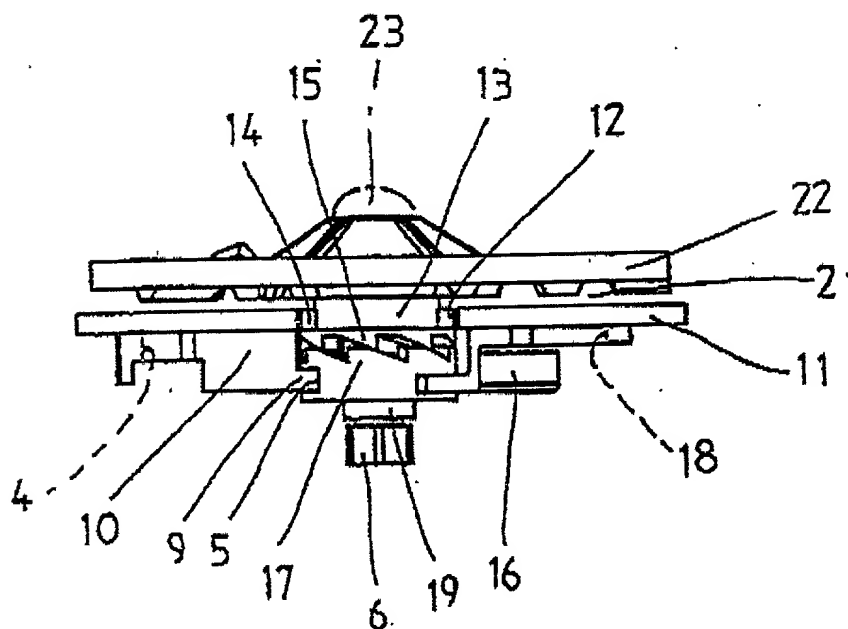


Fig. 5

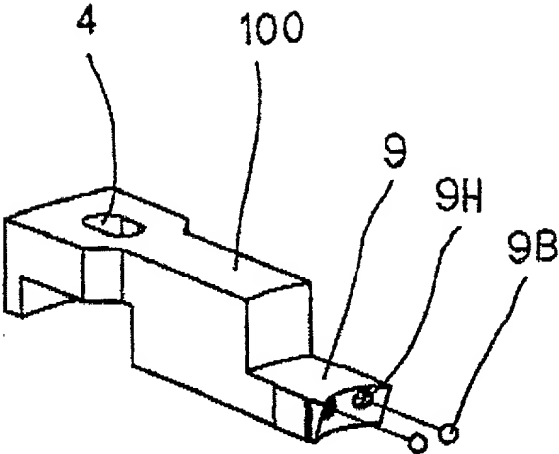


Fig. 6

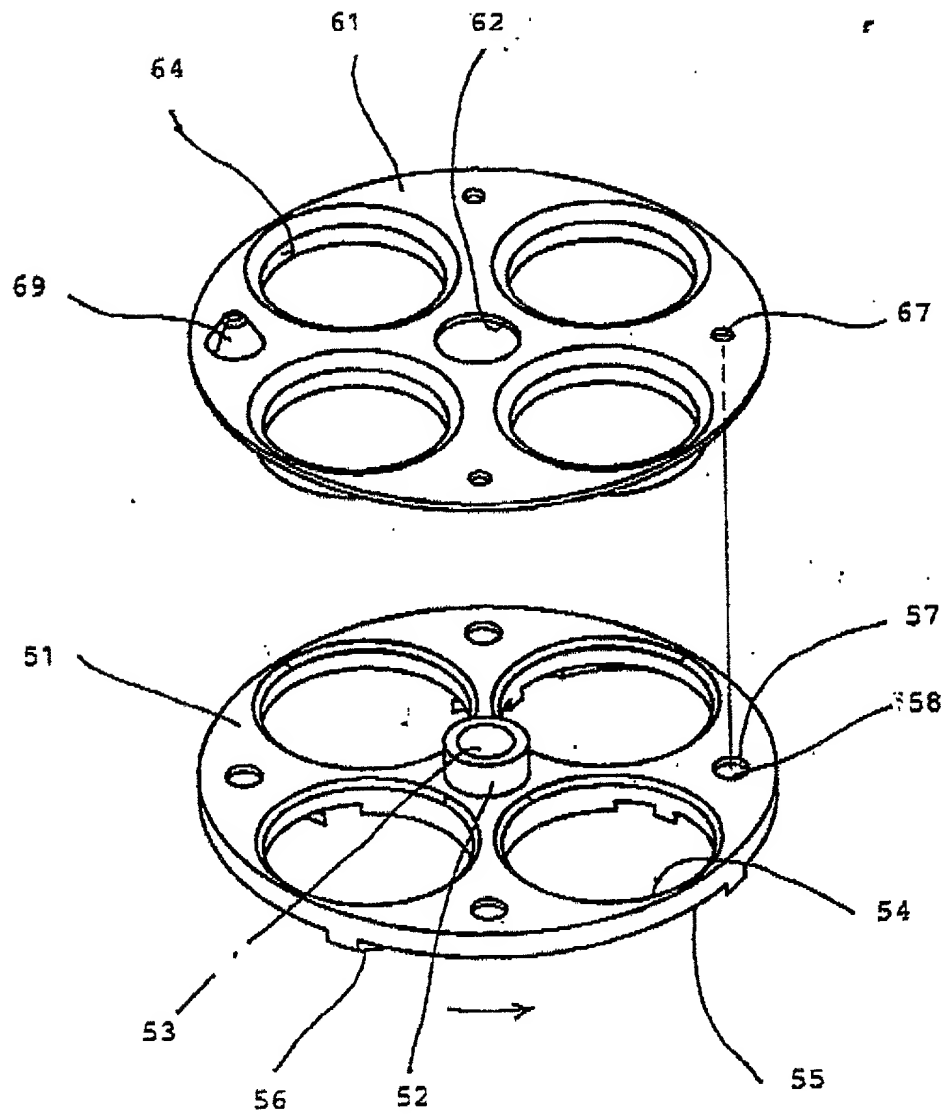
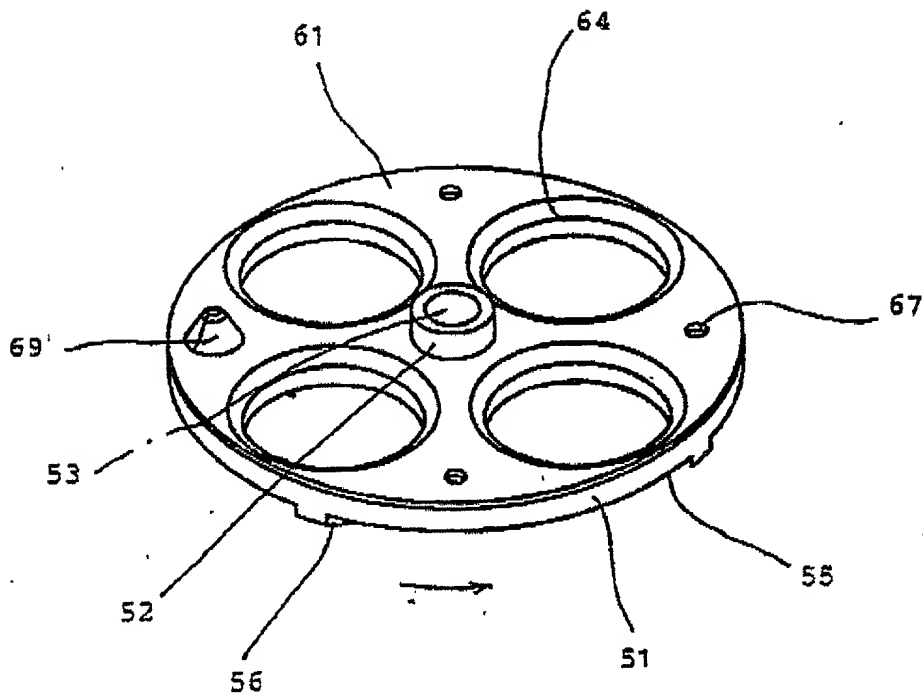
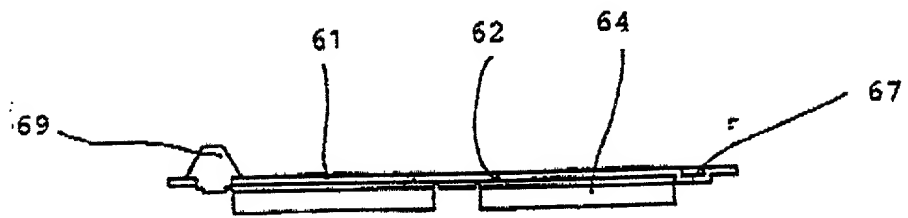


Fig. 7

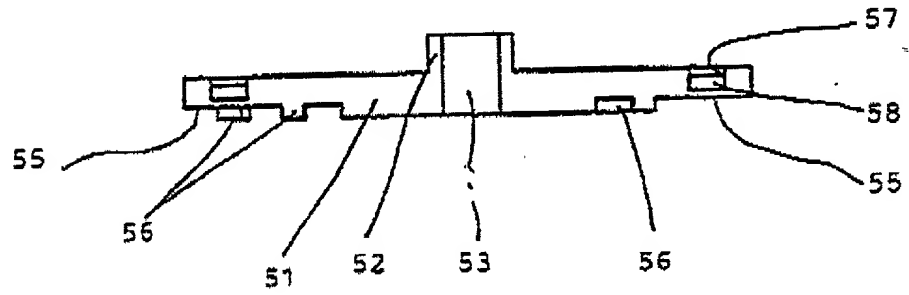


2025-01-09 15:00

Fig. 8



(A)



(B)

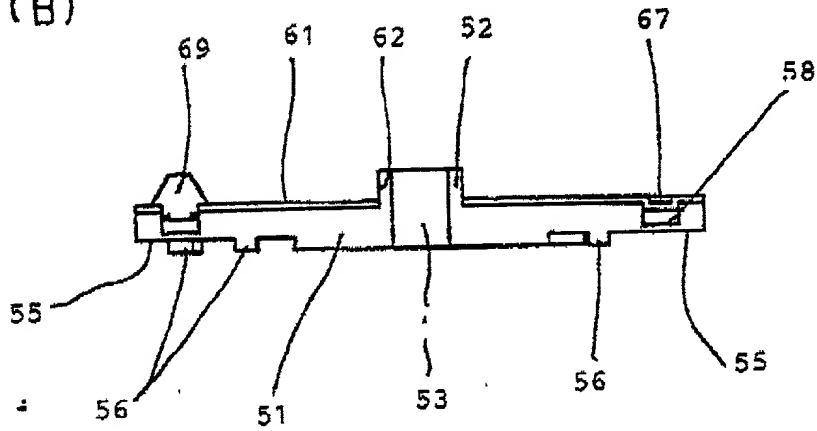
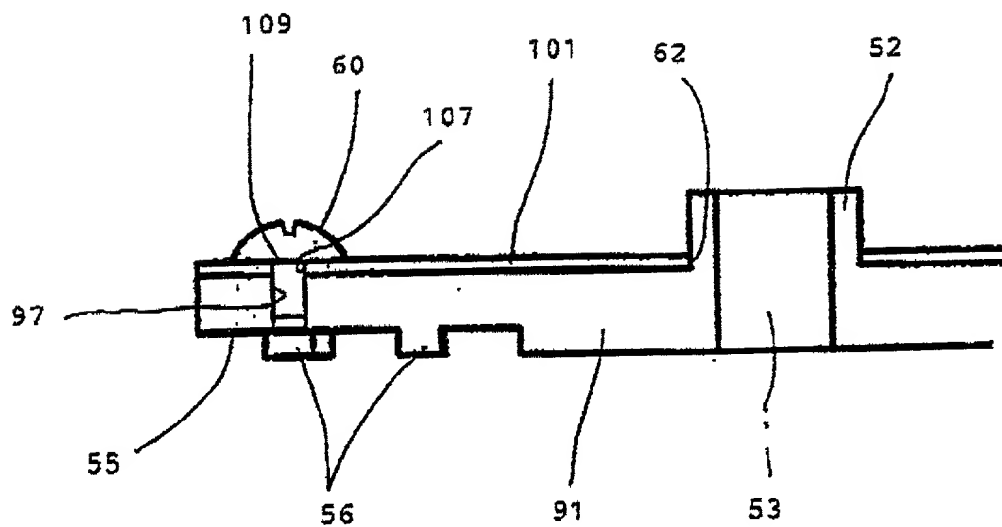


Fig. 9.



COMBINED DECLARATION AND POWER OF ATTORNEY
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL,
DIVISIONAL, CONTINUATION OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type:

(check one applicable item below)

- ☒ original.
- ☐ design.
- ☐ supplemental.
- ☐ national stage of PCT.
- ☐ divisional.
- ☐ continuation.
- ☐ continuation-in-part (C-I-P).

INVENTORSHIP IDENTIFICATION

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

SMALL APPARATUS FOR DISPENSING CIRCULAR PLATE OBJECTS

SPECIFICATION IDENTIFICATION

the specification of which:

(Complete (a), (b) or (c))

- (a) ☒ is attached hereto.
- (b) ☐ was filed on _____, as ☐ Serial No. 0 / _____
or ☐ Express Mail No., as Serial No. not yet known _____
and was amended on _____ (if applicable).
- (c) ☐ was described and claimed in PCT International Application No. _____, filed on _____
and as amended under PCT Article 19 on _____ (if any).

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56,

(also check the following items, if desired)

- ☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and
- ☐ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119(a)-(d))

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

- (d) ☐ no such applications have been filed.
- (e) ☒ such applications have been filed as follows.

PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS

(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION

AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)-(d)

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
JAPAN	9-287541	12 SEPT 1997	<input checked="" type="checkbox"/> YES NO <input type="checkbox"/>
JAPAN	9-291470	18 SEPT 1997	<input checked="" type="checkbox"/> YES NO <input type="checkbox"/>
JAPAN	9-370005	19 DEC 1997	<input checked="" type="checkbox"/> YES NO <input type="checkbox"/>
			<input type="checkbox"/> YES NO <input type="checkbox"/>
			<input type="checkbox"/> YES NO <input type="checkbox"/>

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)

(34 U.S.C. § 119(e))

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

_____/_____/_____
_____/_____/_____
_____/_____/_____

CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S)

UNDER 35 U.S.C. 120

☐ I hereby claim the benefit under Title 35, United States Code, § 120 of any prior United States Applications or PCT International Application designating the United States.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS

DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120:

U.S. APPLICATIONS

Status (Check one)

U.S. APPLICATIONS	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
1. 0 / _____	_____	_____	_____	_____
2. 0 / _____	_____	_____	_____	_____
3. 0 / _____	_____	_____	_____	_____

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO.	PCT FILING DATE	U.S. APPLICATION NOS. ASSIGNED (if any)			
4. _____	_____	0 / _____	_____	_____	_____
5. _____	_____	0 / _____	_____	_____	_____
6. _____	_____	0 / _____	_____	_____	_____

ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS

(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

Overall mean \pm SD		Overall range	
Age (years)	22.0 \pm 1.0	18-25	18-25
Height (cm)	170.0 \pm 5.0	155-185	155-185
Weight (kg)	65.0 \pm 10.0	50-85	50-85
Body mass index (kg/m ²)	22.0 \pm 3.0	18-30	18-30
Heart rate (b/min)	72 \pm 10	50-100	50-100
Stroke volume (L/min)	5.0 \pm 1.0	3.0-7.0	3.0-7.0
Cardiac output (L/min)	3.5 \pm 0.5	2.0-5.0	2.0-5.0
Systemic blood pressure (mmHg)	120 \pm 10	90-150	90-150
Mean arterial pressure (mmHg)	93 \pm 8	70-120	70-120
Left ventricular end-diastolic volume (L)	120 \pm 20	80-160	80-160
Left ventricular stroke volume (L)	70 \pm 10	40-100	40-100
Left ventricular stroke volume index (L/m ²)	100 \pm 15	60-140	60-140
Left ventricular ejection fraction (%)	55 \pm 5	40-70	40-70
Right ventricular end-diastolic volume (L)	100 \pm 20	60-140	60-140
Right ventricular stroke volume (L)	60 \pm 10	30-90	30-90
Right ventricular stroke volume index (L/m ²)	85 \pm 15	50-120	50-120
Right ventricular ejection fraction (%)	50 \pm 5	35-65	35-65
Left atrial end-diastolic volume (L)	80 \pm 10	50-110	50-110
Left atrial stroke volume (L)	50 \pm 10	30-80	30-80
Left atrial stroke volume index (L/m ²)	75 \pm 10	40-110	40-110
Left atrial ejection fraction (%)	45 \pm 5	30-60	30-60
Right atrial end-diastolic volume (L)	70 \pm 10	40-100	40-100
Right atrial stroke volume (L)	40 \pm 10	20-70	20-70
Right atrial stroke volume index (L/m ²)	60 \pm 10	30-90	30-90
Right atrial ejection fraction (%)	40 \pm 5	25-55	25-55
Left ventricular end-systolic volume (L)	50 \pm 10	30-80	30-80
Left ventricular end-systolic volume index (L/m ²)	70 \pm 10	40-100	40-100
Left ventricular ejection fraction (%)	55 \pm 5	40-70	40-70
Right ventricular end-systolic volume (L)	40 \pm 10	20-70	20-70
Right ventricular end-systolic volume index (L/m ²)	55 \pm 10	30-80	30-80
Right ventricular ejection fraction (%)	50 \pm 5	35-65	35-65
Left atrial end-systolic volume (L)	30 \pm 10	10-60	10-60
Left atrial end-systolic volume index (L/m ²)	45 \pm 10	20-70	20-70
Left atrial ejection fraction (%)	45 \pm 5	30-60	30-60
Right atrial end-systolic volume (L)	30 \pm 10	10-60	10-60
Right atrial end-systolic volume index (L/m ²)	40 \pm 10	20-70	20-70
Right atrial ejection fraction (%)	40 \pm 5	25-55	25-55

	<u>Registration No.</u>
Edward J. Quirk	23,018
Philip J. Anderson	29,887
Robert Ryan Morishita	42,907

☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

Quirk & Tratos
3773 Howard Hughes Parkway
Suite 500 North
Las Vegas, NV 89109

Philip J. Anderson
Patent Attorney
(702) 792-3773

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor**HIROSHI**

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

ABE

FAMILY (OR LAST NAME)

Inventor's signature _____

UNSIGNED

Date

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Post Office Address

Full name of second joint inventor, if any

NOBORU

(GIVEN NAME)

ICHIHARA

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature

UNSIGNED

DateCountry of Citizenship Japan

Residence 3-7, Kokaba 1-chome, Iwatsuki-shi, Saitama, JAPAN

Post Office Address

Full name of third joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature

Date

Country of Citizenship

Residence

Post Office Address

(check proper box(es) for any of the following added page(s))

that form a part of this declaration)

☐ **Signature** for forth and subsequent joint inventors. Number of pages added _____

* * *

☐ **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor.
Number of pages added _____

* * *

☐ **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47.
Number of pages added _____

* * *

☐ Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 CFR 1.47)

* * *

☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

☐ Number of pages added _____

* * *

☐ Authorization of attorney(s) to accept and follow instructions from representative.

* * *

(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item)

☒ This declaration ends with this page.